Deer Creek Irrigation District 2004 WUE Grant
Draft Revised Scope of Work

Project Description: In this project Deer Creek Irrigation District will replace and automate it's main canal diversion gates, replace the canal diversion structure at the "Y", install a Supervisory Control and Data Acquisition (SCADA) system, and train the district water manager in its use. The major thrust of the project is to reduce system spillage by improving water diversions, water measurement, and the management of system operations. New water control structures along with SCADA technology will provide system operators with real-time information about flows, water levels and spillage from the system and the ability to remotely control Deer Creek diversions accordingly.

The project is funded through Section A and B of the Proposition 50 Water Use Efficiency Grant. The project was originally proposed as collaborative project between Deer Creek Irrigation District (DCID) and Stanford Vina Ranch Irrigation Company (SVRIC). Stanford Vina has decided not to participate in the project. DWR is funding only the DCID improvements with the project funding reduced accordingly. A summary of Section A and Section B tasks and estimated funding are provided in Tables 1 and 2.

Project Goals and Objectives: The project has two main goals.

- Construct appropriate, cost-effective water use efficiency improvements to provide the ability to better manage and control Deer Creek water diversion and distribution systems (Section A, WUE Grant).
- Develop operations criteria and practices, based on sound science and appropriate monitoring that will cooperatively contribute to improved Deer Creek fish transportation on a voluntary basis (Section B, WUE Grant).

Tasks: The Deer Creek Irrigation District (DCID) is responsible for the completion of the following tasks.

Task 1 – Establish Easements and ROW
Improvements to be constructed under this project will be placed within existing DCID rights-of way (ROW) and that construction access will be acquired though temporary easements. Existing DCID easements and ROW will be researched and identified. If new or expanded ROW or easements are needed, DCID representatives will make contacts as needed with involved landowners.

Task 2 – Prepare Final Designs, Specifications & Contract Documents
Preliminary plans and specifications of project features are presented in this proposal. While conceptually complete and adequate for estimation of project costs, additional effort is needed to complete final designs and prepare construction documents. That work would be performed under this task by a registered civil engineer.

Task 3 – Conduct Project Bidding
It is anticipated that the project will be contracted in two bid packages, one for construction of structures and a second contract for the provision and installation of the

SCADA equipment and related gates, operators and solar/AC power supply systems. Thus two bid packages will be prepared in Task 2; work under this task would involve advertising the bids, responding to questions during bidding, comparing and evaluating bids and awarding contracts based in the least cost, responsive bid. All applicable State requirements would be observed.

Task 4 – Construct Structures
Task 4 would involve the actual construction of the Bid Package 1 facilities by the selected contractor, under the supervision of a registered civil engineer (see Task 6).

Task 5 – Procure and Install SCADA Equipment
Task 5 would involve the actual procurement and installation of SCADA and related equipment as specified in Bid Package, under the supervision of a registered civil engineer (see Task 6).

Task 6 – Provide Engineering Services During Construction
A registered civil engineer will provide the following services during construction: answer contractor questions, review shop drawings, inspect materials and work, record photographs of construction, verify completion, approve payments and track any design changes made during construction. The engineer will prepare as-built drawings at the completion of construction.

Task 7 – Provide SCADA Training, Troubleshooting & On-call Support
While SCADA is considered a proven technology and has been successfully applied to monitoring and control of irrigation distribution systems for nearly 20 years, it nevertheless represents a major technological advance for DCID. Based on experience with introducing SCADA technology to other small irrigation operations, it is anticipated that substantial support will be needed during the first year to ensure that the technology is successfully assimilated and becomes self-sustaining and effective. As part of its contract, the SCADA installer will be required to provide training and troubleshooting services. Under a separate contract, the SCADA installer or engineer will provide on-call technical support relative to operation and maintenance of the SCADA system. This support will cover any hardware problems that may be encountered and software support, including modifications to screens that the operators might find useful.

Task 8 – Conduct Project Monitoring & Assessment
Monitoring and assessment is funded under Section B of the 2004 WUE Grant. The individual tasks and estimated costs associated with monitoring and assessment are provided in Table 2. Monitoring and assessment measures are an integral component of this project to document the water savings actually accomplished by the proposed improvements. With respect to spillage reduction targeted by the SCADA improvements, this will involve monitoring of pre-project spillage at selected sites during 2006. Monitoring will be continued in 2007 through 2011, after the SCADA improvements have been implemented. After any normalization that may be appropriate to make the measured 2006 and 2007 records typical of long-term conditions, the

difference between the two will provide a good indication of the effects of the SCADA improvements on spillage. With respect to seepage, sufficient pre-project seepage tests have been performed on the lateral reaches that will be lined to yield verification-quality seepage reduction estimates. Thus, the estimates of seepage reduction presented in this application (see Benefits) represent the final estimate of water savings, and no further pre project seepage monitoring work is proposed.

Task 9 – Conduct Outreach & Community Involvement
It is expected that community involvement will focus primarily on the DCID and interested landowners and agency representatives, while overall progress and any decisions or outcomes with implication to other program elements would be disseminated to a larger group for informational purposes. Three formal public meetings have been identified thus far to support the project: (1) a kick-off meeting to inform stakeholders about the grant award and provide specific information about the scope and schedule for the project; (2) a design pre-meeting to ensure that landowner concerns are addressed in the facilities designs, and (3) a design review and construction notification meeting to inform landowners of construction impacts and coordinate access to the various construction sites. Additional informal or public meetings will be held as needed to keep landowners and the public informed of the project scope, design and construction progress.

Task 10 – Provide Project Management & Administration
The grantee, assisted by an engineer will be responsible for project management and administration. The grantee will be responsible for ensuring the smooth, timely completion of work, documenting the project's accomplishments and communicating progress and implementation issues, if any, to DWR. This will include preparation of all reports required under the grant agreement, including quarterly progress reports, the comprehensive final report and review and submittal of all technical documents prepared.

Task 11- Permits and License-
Grantee is responsible to obtain all necessary local, State, and federal permits and comply fully with the California Environmental Quality Act, the California Endangered Species Act, and any other applicable statues. Grantee is responsible to obtain all engineering and design permits, if applicable.

Monitoring and Verification: Monitoring and Verification is divided into pre-project and post-project efforts.

Pre-Project
The 2006 monitoring efforts will concentrate mainly on two of the largest sites where spillage will be affected by the proposed near-term improvements. Additional locations where spillage is known to occur will be inspected and operators interviewed to be sure that other spillage sites are not overlooked.

Post-Project
Spillage monitoring will be continued in 2007 and beyond to support the five annual benefit/cost reports. This will provide a record of spillage with the efficiency improvements in place. Considering that the effectiveness of the proposed SCADA improvements depends somewhat upon operator skill and learning, a multi-year record is preferable to capture initial and ultimate project performance. Thus, monitoring will be continued through at least 2011 to capture this transition period and to provide the basis for the annual updates of project benefit/cost.

Conventional, proven methodologies will be used to measure, record and quality-control all targeted spillage flows. This will include use of standard measurement structures where possible, with a preference for broad-crested and sharp-crested weirs as primary flow measurement devices. Non-standard structures might also be employed, provided that reliable stage-discharge functions can be developed through current metering.

Because spillage tends to be highly variable with time, frequent observations are needed to compute reliable spillage volumes. Flow monitoring studies on other irrigation systems indicate that several measurements are required daily to adequately capture the variability in flow inherent to irrigation operations, especially spillage. The plan is to automate data recording at standard intervals of about 15 minutes, and in no case more than hourly. Sites will be visited weekly or biweekly to check for proper flow conditions and to swap out data loggers.

Cost Allocation by Task: Tables 1 and 2 shows the estimated budget for each of the tasks proposed under Section A and Section B of the WUE Grant.

Table 1. Estimated Cost by Tasks for Section A WUE Work

Task #	Description of WUE Section A Work	Cost
1	Establish Easements and ROW	$8,000
2	Prepare Final Design,Specs and Contract Documents	$26,000
3	Conduct Project Bidding	$3,000
4	Construct Structures	$32,868
5	Procure and Install SCADA Equipment	$244,296
6	Provide Engineering Services during Construction	$15,000
7	Provide SCADA Training and Troubleshooting	$3,801
8	Project Monitoring and Assessment (Funded through WUE Section B Grant)	$0
9	Community Outreach and Involvement	$6,000
10	Provide Project Management and Administration	$40,000
11	Environmental Permitting	$15,000
	Total	$418,264
	Contingency 5-10%	$34,771
		$453,035

Table 2. Estimated Cost by Task for Section B WUE Work

Task #	Description of WUE Section B Monitoring Work	Cost
1	Develop Project Mapping & Surveys	$9,500
2	Conduct Facilities Inventory	$9,750
3	Design & Implement Flow Monitoring Program	$42,500
4	Conduct Canal Seepage Investigations	$21,000
5	Assemble Water Balances	$10,400
6	Formulate & Compare Alternative Systems Improvement Programs	$19,700
7	Prepare Feasibility-Level Designs & Cost Estimates	$24,500
8	Environmental Compliance (provided in Sec. A work)	$0
9	Outreach & Community Involvement	$4,500
10	Project Reporting, Management and Administration	$31,000
	Total	**$172,850**

Benefits: Table 3 summarizes the water savings by month, for normal and dry years, that could be accomplished with the proposed near-term improvements. These estimates are based on the SCADA improvements being used to reduce spillage losses by one-third, and the pipeline replacement reducing diversions by 0.2 cfs. These savings are significant relative to the targeted instream flow objective of 50 cfs.

Table 3: Estimated decreases in diversions of Near-term System Improvements.

	Normal Year Conditions (CFS)			Dry Year Conditions (CFS)		
Month	Spillage	Seepage	Total	Spillage	Seepage	Total
April	1.3	0.2	1.5	1	0.2	1.2
may	2.3	0.2	2.5	2	0.2	2.2
June	3	0.2	3.2	1.3	0.2	1.5
July	2	0.2	2.2	1.7	0.2	1.9
August	1.3	0.2	1.5	1.3	0.2	1.5
September	1.7	0.2	1.9	1.3	0.2	1.5
October	0	0.2	0.2	0	0.2	0.2
Annual Volume (AF)	600	100	700	467	100	567

Project Deliverables: The Grantee is responsible for the following deliverables:

- Quarterly Progress Reports and associated documents
- Final Report and associated documents
- Any applicable engineering and permitting documents
- Annual Reports of Benefits & Costs for 5 years

- Construction Contract Documents
- Construction Technical Report
- Monitoring and Assessment Report

Cooperators: In May 19, 2005, the Stanford Vina Ranch Irrigation Company Board of Directors voted to withdraw from participating with DCID in the 2004 WUE Grant. In SVRIC's June 10, 2005 letter to the DCID Board confirming their WUE Grant withdrawal, SVRIC stated that "SVRIC remains committed to assisting any governmental agency with mitigation of environmental concerns." Thus, it is DCID's hope that SVRIC will actively cooperate in bypassing of Deer Creek flows, augmented by DCID as the result of DCID's WUE improvements.